The Northwest Technology Transfer Center
BULLETIN
Number 37 Winter 92/93
A Newsletter of the Local Technical Assistance Program (LTAP)

Some Road Management Basics
Getting the Most From Your Dollars

It's no secret that budgets are tight and that local spending may be forced to handle a larger load in the future. Local officials face great challenges, including:

- How do you invest scarce local road dollars most efficiently?
- How do you gain public support for important projects that are not as visible as potholes, failed pavements, etc.?

Below are some basic ideas from Wisconsin and other states. They bear repeating and are just as valid today as they were in the past.

✓ Plan Ahead

Develop and use a road inventory and management plan. Knowing in detail the condition of your roads, how and where they are deteriorating, helps you make better decisions. A written condition inventory is the starting point for good decisions. Make budget estimates and a priority list part of the plan.

✓ Build Quality

Whatever projects you undertake, do them right. Build quality and long life into each project. It may be better to do half of your projects and do them all right. A long service life always has much better payback than cheap projects that last only a short time.

✓ Correct and Improve Drainage

Get water away from road surfaces and pavements as soon as possible. Give drainage improvements priority — ahead of such routine maintenance upgrades as seal coating or overlay.

As one noted expert said: "The three most important items for proper maintenance of roadways are (1) drainage, (2) drainage, and (3) drainage."

✓ Protect the Environment

Environmental protection is not just a matter of rules and regulations, but of common sense. All our projects should work to minimize erosion, protect wetlands, and preserve resources with unique qualities. Where appropriate, we should balance our transportation system to provide the most efficient transportation modes.

✓ Include Safety in All Projects

Every normal roadway improvement project should consider what effective safety improvements are possible. In addition, local roadway budgets may also include special, separate safety projects. Upgrade signs, markings, and guardrails when you improve the roadway surface.

✓ Think Before You Pave

Don't pave gravel roads unless you are willing to accept the higher long-term cost of a paved surface. Higher-traffic roads may be better served with a paved surface, but this means that you can no longer maintain them with lower cost methods such as grading and graveling. Use seal coat over a gravel surface only on low-volume roads and only where existing base is properly prepared to carry traffic.

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INSIDE

City/County Research Projects Moving Along

Following are various on-going research projects for cities and counties being handled by WSDOT's Research Office. A City/County Research Workshop was held on December 15. Various proposals were reviewed for the city/county research program for the July 1, 1993, through June 30, 1995 time period. We will keep you informed of these new projects as they proceed. For more information on this program, contact Keith Anderson at (206) 586-8959. The status of existing projects is given as of December 15, 1992.

Low Speed Crash Test Criteria

Don Gripne, principal investigator, has begun to work with the Texas Transportation Institute to define the scope of work for the initial crash test. TTI will then put a proposal together for our review and approval. Additional crash tests will depend on the success of the initial test and the remaining funds available.

Heavy Vehicle Vs. Urban Pavements

The City of Seattle Engineering Department began work on the project on April 15, 1992. The project will run through May 15, 1993. The objective is to evaluate the impact of heavy axle bus loads, in particular the Metro Breda dual-mode bus, using the Seattle local street system as a prototype. Further, to explore solutions to remedying the heavy axle loads in order to achieve as close as possible the same impacts as legal loads. Progress has been steady with Task 1, literature search; Task 2, development of Breda axle loading graphs completed; Task 3, bus route identification and compilation of past and present loadings is nearly completed; and Task 4, bus ridership loading data, is about 50 percent complete.

Speed Control Strategies

KJS Associates, Inc., was selected on November 3 to conduct the study. KJS has brought on INCA Engineers, Inc., as a subconsultant to handle the traffic design issues.

Dave McDonald, who worked with the city of Everett on their residential traffic control program, has been employed by KJS for this project. A pre-proposal meeting was held on November 20, and KJS expects to have a proposal ready for our review by the early to mid-December.

RoadRater Correlation Study

GeoEngineers Inc. began work on the project on April 15, 1992. The project will run for 20 months. The project is on schedule with the literature search completed. The uniform testing procedure guide has been developed and is being evaluated by the roadrater teams, and test data for the seasonal correction factors is being collected.

Need to know more?

Contact WSDOT's Library (a free T² resource)

(206) 705-7750
SCAN 705-7750

Eye and Face Protection

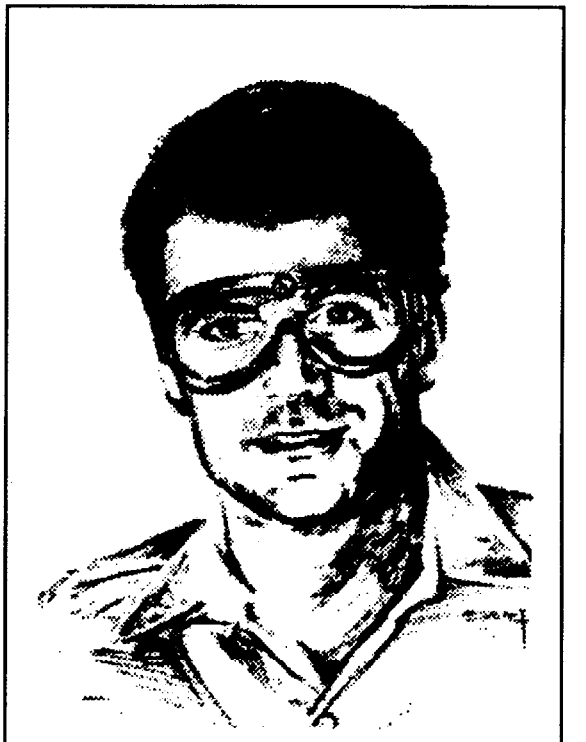
Safety Goggles

Safety goggles offer effective protection from impact, flying particles coming from many different directions, and chemical splashes — more than that offered by safety glasses. For this reason, goggles have become widely used in industry. They should be worn during grinding, chipping, woodworking, and riveting operations as well as in the lab to protect from chemical fumes and splashes. Specially designed goggles may be worn over your regular prescription glasses. (If you wear contact lenses, let your supervisor know. Your company may have a special policy regarding contacts, which may be hazardous to your eyes in some operations.)

Types of Safety Goggles

Goggles are surrounded by a shield that fits snugly on the face all the way around the eyes. Because of their snug fit, the shields of standard safety goggles have ventilation holes to keep them from fogging up. Some goggles have hooded or indirect ventilation openings to keep out thick hazardous dust, chemical splashes, or molten materials. The following goggles are worn in special situations:

- Wire-screen goggles have a wire-mesh lens instead of a glass or plastic lens to provide the greatest ventilation while protecting from flying particles.
- Respirator goggles are designed with a high nose bridge so they can fit with a half-mask respirator.
- Rubber-frame goggles protect from fast-moving fine dust rather than major impact hazards.
- Visor goggles provide shading from overhead lights and extra protection from falling chips and particles.
- Splash goggles are not ventilated for the greatest possible protection against chemical splashes and hazardous mists and dusts. They must be specially coated to prevent fogging.
- Tinted goggles reduce glare from bright lights or molten materials.



Safety goggles are the most widely used type of eye protection. Goggles offer more protection from impact, flying particles, and chemical splashes.

Choosing the Right Goggles

When choosing your goggles or other protective eyewear, make sure they are certified by the Safety Equipment Institute (SEI) to conform to American National Standards Institute eyewear standards. Select goggles that fit snugly but comfortably around the bridge of the nose, cheeks, temples, and forehead. The strap around the base of the head should hold the goggles secure. If your work requires side vision for complete safety, keep this in mind when you choose goggles, or consider using safety glasses instead.

Care and Use

No matter how well made your goggles are, they are going to interfere with your field of vision to some degree. Keeping your goggles as clean as possible according to the manufacturer's instructions will minimize this hazard. Avoid storing your goggles with other things on top of them that could bend or distort them. Replace scratched or cracked lenses; scratches lessen the impact resistance of the goggles and impair your ability to see.

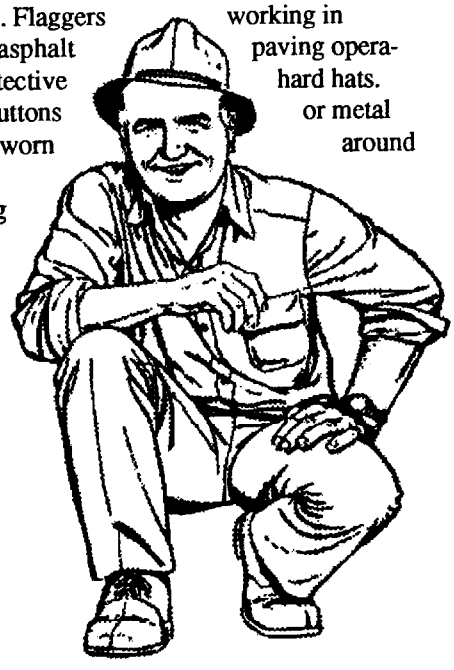
Safety goggles can protect you from many kinds of hazards, but only if you wear them. Make it a habit to wear your goggles on the job, and your eye-safety outlook will always be "20/20."

The Law on Hard Hats

We are continuing asked about the requirements for the use of hard hats in the state of Washington. Washington Administrative Code (WAC) clearly defines the use of hard hats. Common sense dictates that we "save our heads."

WAC 296-155-205 Head Protection

1. All employees on any construction site shall be provided an individual hard hat which meets all requirements of (a) and (b) of this subsection. Employers shall provide individual hard hats at no cost to the employees.
   (a) Hard hats for the protection of employees against impact and/or penetration of falling and flying objects shall meet the specifications contained in American National Standards Institute, Z89.1-1969, Safety Requirements for Industrial Head Protection.
   (b) Hard hats for the head protection of employees exposed to high voltage electrical shock and burns shall meet the specifications contained in American National Standards Institute, Z89.1-1971.
2. All employees must have their individual hard hats on site and readily available at all times.
3. All employees shall wear a hard hat on any construction site whenever there is a potential exposure to danger of flying or falling objects to persons working or occupying the area.
   Note: The hard hat may be removed whenever there is no potential exposure to a hazard.
4. Employees working on asphalt paving crews when they are exposed to extreme temperatures from hot mix and when they are not exposed to falling objects need not wear protective hard hats. Flaggers working in conjunction with asphalt paving operations shall wear protective hard hats.
5. Caps with metal buttons or metal visors shall not be worn around electrical hazards.
6. Employees working near moving machinery or in locations which present a hair-catching or fire hazard shall wear caps, nets or other head and face protection that will completely contain the hair.



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✓ Provide Adequate Base

Roads need a base course to spread the pressure of vehicle tires so soils can support the traffic loads. The depth of the base course depends on traffic loads and natural soil strength. Before you surface an aggregate road, improve the base for adequate strength and drainage.

If you do not have enough experience locally to design the base course, invest in professional soil testing and pavement design. It is worth the money.

✓ Use Good Housekeeping

If you do not maintain the facilities you have, you will not earn the taxpayer's respect. They will not have confidence in how you will treat new facilities. Take pride in all your work. At minimum:

- Routinely clean culverts, ditches, and drainage structures.
- Remove brush for vision and safety.
- Clean bridge beams and bearings to prevent corrosion.
- Keep signs and traffic control devices in good condition.
- Keep maintenance buildings and equipment neat and clean.

✓ Develop Public Policies/Keep Adequate Records

Update your traffic and sign ordinances. Prepare written policies for critical areas such as snow and ice control, driveway permits, and utility repair requirements. Comply with all published safety and design standards appropriate for your road conditions.

✓ Be Knowledgeable

Above all, know that what you do is the best you can do. Keep in touch with current practices, equipment, and materials. Have a professional handle tricky situations, and use common sense when making all your decisions. Take advantage of training opportunities provided by your technology transfer (T^2) center to broaden the skills of you and your staff. Also look out for training opportunities provided by on-the-job, local colleges, or community enrichment programs and others.

(Adapted from Crossroads, the newsletter of the Wisconsin Technology Transfer Center.)

Depression is Serious Business

Laura couldn't eat or sleep; she frequently missed work because she was too tired or depressed to go. Sometimes she cried uncontrollably for no reason. Laura knew things had changed but didn't know why, and she felt it was too hopeless and futile to try to do anything about it. Her co-workers noticed that she seemed to have no interest in work, her home life, or her personal appearance. They wondered what was wrong and what they could do to help.

If you've noticed these kinds of symptoms — the symptoms of depression — in yourself or someone you know, there is something you can do. Depression can be treated with a combination of support, medical intervention, and self-help.

What Is Depression?

Everyone gets "the blues" from time to time, but depression is more than "the blues." It is a feeling of hopeless despair that can leave the victim too overwhelmed to reach out for help. One in five people have suffered from depression at some time. Depression may be caused by something that happened in the person's life — it is a normal stage in the grieving process — or it can arise for no reason. One type of depression — bi-polar disorder — involves extreme mood swings from "high" to "low." Researchers now believe that some kinds of depression are the result of chemical imbalances in the brain that can be treated with a combination of therapy and medication. The good news is that most sufferers of depression do eventually recover to lead normal, fulfilling lives.

Treating Depression

The first step in dealing with depression is a medical checkup. Some other diseases can mimic depression, which clears up when the disease is treated. And sometimes the medications you are taking for other conditions can cause depression. If your depression might be related to life conditions, such as a loss, anger, or loneliness, a doctor can refer you to a therapist who can explore those areas with you and help you regain your sense of well-being. Or your doctor may refer you to a psychiatrist who can prescribe antidepressant medication to help you while you're recovering from depression. Antidepressants remove the physical symptoms of depression so you can begin to deal with it. A combination of these two approaches is not unusual. Remember that depression can be caused by a combination of physical imbalances and life stresses.

If the whole idea of doing something about your depression seems hopeless, talk to a trusted friend. It really does help.

Self-Help

Once you have taken the first step toward recovering from depression, you will discover other things you can do — exercise; setting small, achievable goals each day; leaning on friends a little for support (its okay to do this!); and talking regularly to a trusted person — will all help.

When to Intervene

Depression can be a downward spiral of withdrawal, leading to more sadness and more withdrawal. When a co-worker seems to have become depressed, talk to him or her. Don't wait for the depression to go away by itself. Bring the situation to the attention of family members or close friends if possible, and express your concerns to your supervisor. Remember, in the midst of depression, the first step toward self-help can be terribly hard, but once taken, it leads to the next one. With help, the ability to cope with life will return.

Symptoms of Depression

✦ ✦ ✦ ✦

Loss of interest in home and work

Change in appetite or sleeping habits

Extreme fatigue

Anxiety

Difficulty concentrating

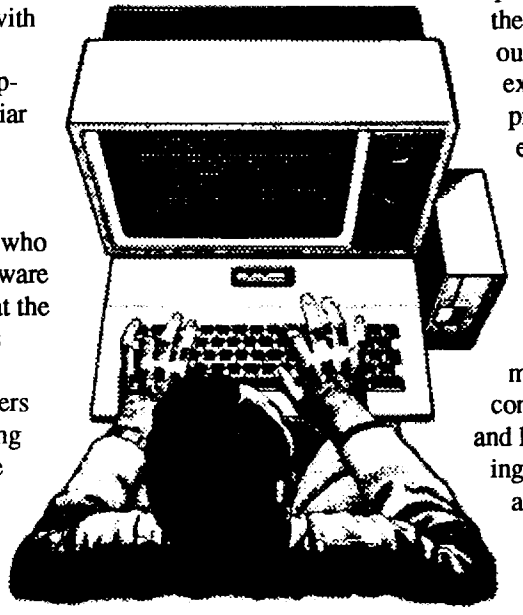
Thoughts of death or suicide

Poor self-image

Computers in the Engineer's Workplace

By Gary Beckner, P.E.

At the recent national ASCE convention, the involvement of computers in the engineering office was highlighted during two technical sessions. The desktop personal computer is replacing the main frame for most computer analysis, especially with the dramatic drop in price of 486 class computers. The reliability of desktop computers was reported to be somewhat inconsistent in analysis results. This was said to be more prevalent with 8088 and 286 class PCs, and much less so with 386 and 486 class PCs. Similar patterns for Apple class computers seemed to hold. Even the engineer's best friend, the spreadsheet, can be unreliable. So what's the problem with these modern tools of the trade?



The background of the software developers can be very important. Engineers familiar with the application need to be closely involved in the development of program coding. Computer programmers applying formulas and mathematical principals, but who are not engineers, are producing some software programs without an understanding of what the output means. The user must ask questions before he purchases a package.

How do engineering department managers get a handle on the numerical results coming from the computer? Engineers must realize that erroneous results are easy to get; by just improperly entering data and not following the program's input code format. It is also common for software programs to have code conflicts and errors that show up only for certain computation sequences. Frequently, code errors are left for the user to discover. Alternate checking of results should be mandatory at all levels of project design. Checking can be done by approximate hand methods, by changing computer hardware, and by running a different software program.

Of a more crucial aspect, a proper computer model has to be correctly set up. Engineers who create a model and its nodes or links, must understand how the model will behave and especially understand the failure modes. Formulas need to be run and reviewed for several conditions if a program is created in-house, even for input data abuse conditions. Complicated formula routines in a common spreadsheet should be verified by calculator and hand checked. Intended limits of in-house programs should be clear to the user.

A growing concern shared by software developers, educators, and engineering managers in our profession is the competence of the person performing the data input. Frequently, the data is input by an engineer who is right out of school and who has little engineering experience. This would appear to be good project economy, but only until output errors in the project's design appear. Managers must know what is happening and the implications thereof of data input. There is no substitute for experienced model builders guiding the inexperienced computer operator. Understanding the behavior of a model and its failure modes are essential to proper use of the computer. This only comes from experience and knowledge in the application of engineering principals in the design project. Looking at the output and identifying obvious errors and inconsistent patterns is a mark of an experienced engineer. Additionally, the young engineer is probably going to have to look out for himself to avoid becoming "trapped" behind the computer for project after project. The young engineer does not learn the profession and become a viable engineer this way. It is essential for managers to broaden the experience of young engineers, or they are really depriving the next generation of designers the essential tools to continue the profession.

(Source: Olympia-Tacoma Section ASCE Newsletter, December 1992. Gary Beckner, P.E., is president of this chapter of ASCE.)

Winter 1992/93
Operating Tips

Use of the T² Center's Electronic Bulletin Board

Using the Bulletin Board

Wildcat is a full featured menu driven bulletin board with up to 9,600 baud capability, message, bulletin, and file transfer areas. Transmission speed is determined by the speed of each modem. The bulletin board has a 2,400 baud modem and therefore, if your modem has a 1,200 baud rate, your transmission speed will be 1,200 baud. Call the bulletin board by dialing (206) 705-6840 or SCAN 705-6840.

When you access the wildcat bulletin board system (BBS), it will ask you for your name, both first and last. It will then ask you for your password. If you are a first time user, you will be asked to type in your password twice. You will then be asked a number of questions including type of protocol, your birth date, and mother's maiden name. This is used in the event you lose or forget your password, we can retrieve it for you.

Bulletin Menu

Once you have answered the questions, you will be greeted with the "Welcome" screen and asked if you would like to view the Bulletin Menu. The bulletin area will contain information on educational opportunities, listing of videos in the T² video catalog, and special announcements.

If you choose not to view the Bulletin Menu, the system will check your mail box for personal messages and move to the Main Menu.

Main Menu

The Main Menu, the heart of the system, provides access to the system statistics, your configuration, your help level, and the other menu areas. At any menu, you can get a help screen by pressing the "?" key. The letters in brackets [ ] provide a single key stroke option selection.

```
MAIN MENU:
    [M] . . . . . Message Menu          [F] . . . . . Files Menu
    [C] . . Comments to the SYSOP       [B] . . . . . Bulletin Menu
    [P] . . . . . Page the SYSOP        [I] . . . Initial Welcome Screen
    [Q] . . . . . .Questionnaire        [V] . . . . . Verify a User
    [Y] . . . . . .Your Settings        [S] . . . . . .System Statistics
    [U] . . . . . Userlog List          [N] . . . . . Newsletter
    [G] . . . Goodbye and Log-Off       [H] . . . . . Help Level
    [?] . . . . . .Command Help
You have been on for 0 minutes, with 120 remaining for this call.
MAIN MENU: [M F C B P I Q V Y S U N G H ?] >
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Message Menu

If you wish, you can leave messages to other users by selecting option [M] to move to the Message Menu and following the prompts. While in the Message or File menus, you can return to the Main Menu by pressing [Q].

```
MESSAGE MENU:
    [Q] . . . Quit to the Main Menu        [U] . . . Update Folders for Mail
    [R] . . . . . .Read Messages           [S] . . . . . Scan Messages
    [E] . . . . . Enter a Message          [D] . . . . . Delete a Message
    [T] . . . . . Text Search              [C] . . . . Check Personal Mail
    [G] . . . Goodbye and Log-Off          [H] . . . . . Help Level
    [?] . . . . . Command Help             [F] . . . . . FILE SECTION
You have been on for 1 minutes, with 119 remaining for this call.
Folders Open:  A, B, C, D
MESSAGE MENU:  [Q U R S E D T C G H ? F] >
```

File Menu

From the Main Menu, press [F] to access the File Menu. Since a majority of users download the GSPs and Amendments, I will use that as an example. (**Note:** At this and all other menus, read the help message that appears at the bottom of your screen when you make a selection.)

```
FILE MENU:
    [Q] . . . Quit to the Main Menu        [I] . . . . Information on a File
    [L] . . . . .List Available Files      [D] . . . . . Download a File(s)
    [U] . . . . . Upload a File(s)         [N] . . . . .New Files Since [N]
    [T] . . . . . Text Search              [S] . . . Stats on Up/Downloads
    [F] . . . . . File Transfer Info.      [G] . . . . Goodbye and Log-Off
    [H] . . . . . Help Level               [?] . . . . . Command Help
    [M] . . . MESSAGE SECTION              [V] . . . . . .View an ARC File
    [R] . . . . . Read a TEXT File
You have been on for 1 minutes, with 119 remaining for this call.
FILE MENU:  [Q I L D U N T S F G H ? M V R] >
```

Steps to Downloading

Let's start by testing the available files. Press [L] and you will get a message saying:

Area(s) to list [Type [L] for selections]:

By pressing the [L], you will get a selection of what areas or groups of files are available. Press [3] for the GSPs and the system will present a listing of all the files in the GSP directory.

To select which files to download, you can press [D] and it will ask you for the file name you wish to download. If you have multiple files to download, press [M] to mark the file(s) you wish to download. After you have marked all the file(s), press [D] to download.

After you have pressed [D] to download, the system will ask you to select a download routing or protocol (if you selected only one protocol when you answered the questions when you first logged on, that will be the only protocol you will see). After selecting a protocol (let's use XModem), the system will ask for the name of the file to download, or if you have marked a file or files for downloading (an example would be "-GSPIDX.DOC"), when you press the enter key you will get a message telling you the size, approximate transfer time, and how to stop the file transfer if needed.

At this point, go to your computer's communication system to indicate the download. Be patient, depending on the speed of your modem it could take a few minutes. When you have finished with the file transfer, the computer returns to the File Menu, exiting the BBS. To logoff the BBS, press [G] and Wildcat will ask if you are sure. If you press [Y], it will log you out of the system. Also, disconnect or hang-up from your communications system.

Conclusion

This has been a quick tour of Wildcat and has only touched on the basics of the program. If you have the time and would like to explore more of the features of Wildcat, feel free to do so. The system is there to assist you, so we would like to hear from you as to question or comments you may have. If you have a problem with the system, have questions, or comments, give us a call at (206) 705-7373.

Setting Up the Computer Before Using BBS

Accessing the UTEC/T^2 bulletin board is not a difficult task if you have some understanding of modems and communications packages. The Wildcat system which is used on the bulletin board will respond to most modems and communications packages. In most cases, the default settings of the modem and the communications package being used is recognized. There are a few settings which are important to check to ensure efficient operations of the modem in communicating and downloading from the bulletin board.

Baud Rate

The baud rate determines how fast data is transmitted in bits per second (bps). Each character is transmitted using ten bits (eight data bits plus the start and stop bits). The bulletin board has a 2,400 baud modem, so it can communicate at a baud rate up to 2,400 bits per second.

Bits

There are several other settings which are important to address when communicating with the bulletin board. We recommend that the data bit setting be at 8, start and stop bits at 1, and the parity settings be at none. This is not a requirement as the bulletin board will adjust to the setting of the computer with which it is communicating.

Half Versus Full Duplex

Most communications packages will operate at either half or full duplex. Generally, in computer communications, full duplex allows both computers to transmit and receive data at the same time. Half duplex permits only one computer to transmit at a time. We recommend that full duplex be used.

Dial Prefix

Most communication packages allow you to specify a different dial prefix, which is a sequence of characters sent to the modem before the phone number is set. You may need to specify a dial prefix or indicate whether your phone system uses tone or pulse dialing. If your system uses tone dialing, the value should be set to AT DT. If your system uses pulse dialing, the prefix needs to be set at AT DP.

Terminal Emulation

A terminal is simply a screen and keyboard that allow you to communicate with a computer. Some computers use specific types of terminals, such as VT100s or VT52s. This is termed terminal emulation, and we recommend using a VT100 emulation.

Protocols

There are several different methods of transferring information via modems. These methods are referred to as "communications protocols." The Wildcat bulletin board system has nine protocols available and following is a brief explanation of what they are and what they will do. Not all protocols are supported by all communication packages. Be sure that you check your communications package manual for which protocols are supported before attempting to download files.

XModem File Transfer

The BBS supports two variations of the XModem protocol, originally developed by Ward Christensen, called XModem and XModem/CRC respectively. XModem offers the advantage of error checking on a block-by-block basis to assure that the data sent contains no errors. It does this by adding a checksum byte to the end of each 128 byte block of data; the receiver calculates its own checksum and compares it to the one received. If an error is detected in the transmission, XModem will request that Wildcat retransmit the block of data. In addition to the above checksum comparison, XModem/CRC adds another level of error detection using a complex Cyclical Redundancy Check algorithm.

XModem and XModem/CRC are slow transfer protocols when compared to many others available. They should only be used when your software supports no other protocol. XModem/CRC is preferable to XModem due to its greatly improved error checking.

1K-XModem

This protocol performs exactly like regular XModem/CRC, but increases the block size to 1,024 bytes, hence the name 1K. It is slightly faster (on fairly clean phone lines) than regular XModem due to a smaller number of blocks being sent, and therefore fewer block checks being made.

YModem

YModem is a protocol devised by Chuck Forsberg of Omen Technology which adds a number of enhancements to protocol based transfer. Block sizes are variable at 128/1,024, but 1K is the usual size. Error checking makes use of CRC-16, accurate to

99.99 percent. By definition, all YModem transfers are capable of sending multiple files at one request, with the file size and date included in the "header block" sent prior to each file. YModem supports multiple file transfer (both down and up) of up to 99 files with Wildcat.

Caution: A number of communication programs incorrectly use the term YModem but actually send using 1K-XModem. This practice is not proper and will result in a failure when used with a true YModem transfer as used by Wildcat.

Use of YModem, if supported by a caller's software, is recommended over XModem and 1K-XModem for speed, reliability, and features.

YModem/G

This variation of YModem is available only to callers making a "reliable" connection using a modem supporting MNP (Microcosm Networking Protocol) or the U.S. Robotics ARQ hardware error checking. If a MNP connection is detected, Wildcat will add this protocol choice (as well as 1K-XModem/G — see below) to the available options.

MNP is a hardware based system in which the modems perform the actual error checking and correction, if needed. The software such as Wildcat and QModem simply send the information blindly from one system to the other using the protocol for block sorting information only. For this reason, these two protocol choices **only** appear if a MNP connection is detected at logon.

YModem/G is among the fastest protocols with the exception of the newer version of ZModem discussed below. If you have a modem that supports MNP or ARQ, YModem/G should be your usual choice on the BBS. Connections using two U.S. Robotics HST modems, with ports locked at 19,200 or 38,400 at both ends, results in throughput in excess of 1,725 characters per second (equivalent of over 14,000 bps)! YModem/G also supports multiple file transfer (both down **and** up) of up to 99 files at one time.

1K-XModem/G

This version of 1K-XModem makes use of MNP hardware error correction to do away with the block-by-block checking in the normal version. The result is a very fast single file transfer protocol for use if YModem/G is not readily available.

ZModem

This is another protocol developed by Chuck Forsberg. It is a "streaming protocol," which sends variable sized blocks of data with CRC-32 error checking for an accuracy of 99.9999 percent, but does not wait for an acknowledgment from the receiving computer. The sending system assumes data received is OK unless a repeat request is sent for a specific block. This streaming activity tends to make ZModem one of the fastest protocols available (but very slightly slower than YModem/G or 1K-XModem/G). ZModem also supports multiple file transfer capability, and should be considered in situations, where MNP is not available or another batch transfer protocol cannot be used. ZModem also has the unique capability to resume file transfers that have been aborted for some reason and thus, only partially completed. This is called crash recovery.

Kermit

This protocol's main claim is not speed, but rather its ability to interact with many types of computers from mainframe to micros. It can cope with systems limited to 7-bit characters even when the data to be transmitted is in 8-bit form. All characters to be sent are translated into standard printable characters and reconstructed on the receiving end.

While not terribly efficient, it is sometimes an absolute necessity for data transfer involving different types of systems and terminal types. It is not recommended for PC to PC transfers.

ASCII Data Capture

ASCII transfer is simply the sending of information as characters, and is limited to 7-bit information. The transfer of files in ASCII mode can be done if your system is capable of any type of data capture. ASCII transfer is limited, and some sort of error checking protocol is required if you intend to transfer files with extensions of EXE, OBJ, COM, ARC, or ZIP, as well as tokenized **BASIC** programs and files containing the IBM PC special ASCII characters (ones with ASCII values above 128). These files cannot be transferred in ASCII mode since ASCII transfer is only 7-bit and these types of files require the full 8-bit transfer of the data, with no translation of the contents of the file.

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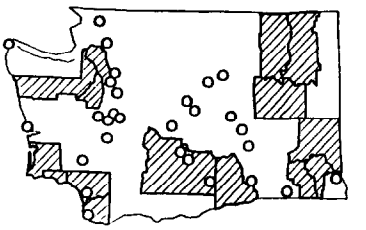
The 1992 Fall Roadshow Program



By Stephanie Tax

This fall the Northwest Technology Transfer Center was able to put on 51 roadshows with the cooperation of the cities and counties listed below. Our trainer, George McHaney, has roadshows continuing through December 18, 1992, and he has agreed to begin the spring session March 1, 1993.

We believe the fall roadshows were a success, and we look forward to seeing all and more of you this spring. We will be sending out an updated video catalog in February, so you can see what is available for your spring roadshow. If you have any questions or need more information, please contact me at (206) 753-0405.

No	Date	Agency	Host	Location	Persons
1	10/5	Columbia County	Tom Benson	Dayton	12
2	10/7	Moses Lake	Tim Varney	Moses Lake	18
3	10/7	Ephrata	Wayne Hampton	Ephrata	4
4	10/8	Clarkston	Jerry McConnell	Clarkston	11
5	10/9	Walla Walla	Stanley Williams	Walla Walla	12
6	10/12	Roslyn/CleElum	Bob Fischer	Roslyn	7
7	10/13	Grandview	Gus Arteaga	Grandview	11
8	10/13	Pasco	Marvin Ricard	Pasco	9
9	10/14	Benton County	Jim McAuliff	Kennewick	12
10	10/14	Benton County	Jim McAuliff	Prosser	12
11	10/15	Yakima County	Earl Foreman	Yakima	45
12	10/15	City of Yakima	Ken Kohagen	Yakima	16
13	10/15	City of Yakima	Ken Kohagen	Yakima	9
14	10/16	Selah	Dale Nobel	Selah	8
15	10/19	Bridgeport	John Troutman	Bridgeport	4
16	10/20	Stevens County	Duane Lehman	Chewelah	13
17	10/20	Stevens County	Duane Lehman	Hunters	11
18	10/21	City of Chelan	Bill Greenway	Chelan	15
19	10/22	Leavenworth	Bill Lay	Leavenworth	5
20	10/22	Wenatchee	Curt Greer	Wenatchee	11
21	10/26	Garfield County	Ron Horn	Pomeroy	9
22	10/27	Ferry County	Larry Beardsley	Republic	11
23	10/27	Ferry County	Larry Beardsley	Inchelium	8
24	10/28	Lincoln County	Bob Breashears	Wilbur	20
25	10/28	Lincoln County	Bob Breashears	Davenport	24
26	10/29	Whitman County	Lon Pedersen	Colfax	34
27	10/30	Othello	Gary Armstrong	Othello	7
28	11/3	Everett	Ken Housden	Everett	27
29	11/9	Ocean Shores	Jim Ammons	Ocean Shores	9
30	11/10	Pacific County	Ed Kaech	South Bend	18
31	11/12	Wahkiakum County	Jack Tobin	Cathlamet	7
32	11/13	Island County	Jack Taylor	Coupeville	47
33	11/16	Jefferson County	Earl Wells	Port Hadlock	18
34	11/17	Kitsap County	Engel Loop	Port Orchard	47
35	11/19	Mount Vernon	Darrel Tawes	Mount Vernon	3
36	11/19	Bellingham	Gary Almy	Bellingham	14
37	11/19	Bellingham	Gary Almy	Bellingham	24
38	11/20	Redmond	Jim Cooper	Redmond	12
39	11/23	Mountlake Terrace	Jim Portch	Mountlake Terrace	10
40	11/24	Cowlitz County	Martin Carty	Kelso	48
41	11/30	Puyallup	Charles Vietenheimer	Puyallup	7
42	11/30	Puyallup	Charles Vietenheimer	Puyallup	6
43	12/1	Enumclaw	Mark Bauer	Enumclaw	17
44	12/4	Makah Tribal Center	Todd Wells	Neah Bay	3
45	12/8	Centralia	Carl Knapp	Centralia	9
46	12/8	Kalama	Carl McCrary	Kalama	5
47	12/9	Clark County	Bud Cave	Vancouver	23
48	12/9	Vancouver	Bob Tabor	Vancouver	11
49	12/14	Eatonville	Seth Boettcher	Eatonville	9
50	12/16	Gig Harbor	Willie Hendrickson	Gig Harbor	7
51	12/16	Auburn	Frank Currie	Auburn	14

51 sessions, 44 agencies, 763 people, 2,064 person hours of training.

In the News

Washington APWA Elects New Officers

The chapter has elected the following public works professionals to serve as officers and board members for 1993.

- **President:** Dave Ford, DPW city of Anacortes
- **Vice-president:** Dennis Covell, Director of Engineering and Utilities, Yakima
- **Secretary:** Gwenn Maxfield, Commissioner, Woodinville Water District
- **Treasurer:** Craig Olson, AWC
- **Board Positions:** Lyle Bland (DPW, Wenatchee); Jerry Copeland (DPW, Yakima); William Derry (Manager, Water Resources Department, CH^2MHill); and Gary Wheeler (Manager, Engineering Division, Tacoma)

National Engineers Week Set

The week of February 14 through 20, 1993, has been assigned to honor American professional engineers and to encourage young people to join the ranks of engineers. Engineers are encouraged to contact their local engineering society chapters to find out how they can give a presentation for engineering to a science or math class at their local schools.

New National Transit Institute (NTI) Created

ISTEA created this new institute which is located at Rutgers University in New Jersey. The NTI is modeled after the National Highway Institute (NHI) and is designed to expand and improve in-service education for managers and engineers in mass transit. Alan Gibbs, New Jersey Human Services Commissioner, will be NTI's first director.

(Source: AASHTO Journal, November 13, 1992.)

Local Agencies Receive Project Excellence Awards

At the APWA Fall Conference in Clarkston awards were given to local agencies by WSDOT's Local Programs division.

Local government agencies competed for awards in the following categories: Best Special Project, Best City Project, Best County Project, Outstanding Achievement, and Outstanding Achievement for Enhancement. Projects selected for awards were judged on safety enhancement, construction methods, innovative design, cost effectiveness, environmental compatibility, effective project administrationm, and public satisfaction and acceptance of the project.

The city of Auburn's Engineering Division took the award for the Best City Project category for its Stuck River Bridge project on the East Valley Highway. The project replaced the original bridge, constructed in 1923, with a new four-lane structure.

Competing with 20 other applicants, the city of Seattle won the Outstanding Achievement Award for its West Seattle Swing Bridge project. The new span over the Duwamish River is the only hydraulically operated, double-leaf concrete swing bridge in the world. The city of Seattle also won an honorable mention in the Best City Project category for the Pacific Street HOV lane in the University District.

King County Public Works received honorable mention in the Best Special Project category, which recognizes unusual design or use of materials, for restoration of the Green River Gorge Bridge. Refurbishment of the 74-year old structure required sensitivity to the gorge setting with special attention paid to water quality, revegetation, and general aesthetics.

WSDOT's Local Programs Division administers state and federal matching funds to cities and counties for the improvement of city streets and county roads.

Asphalt Rubber

The use of recycled crumb rubber from shredded tires in hot mix asphalt (HMA) pavements is mandated in Section 1038 of the ISTEA. Beginning in 1994, ISTEA will establish a minimum utilization requirement for crumb rubber asphalt (CRA). A certain percentage of the total tons of HMA laid (financed by federal aid funds) in each state will be required to contain CRA. The percentages are 5 percent for 1994, 10 percent for 1995, 15 percent for 1996, and 20 percent for 1997 and each year thereafter. Although several experimental CRA pavements have been constructed in the past, there are many unresolved issues concerning (a) human health and the environmental impact, (b) recyclability of HMA pavements containing rubber, and (c) performance of CRA pavements. The FHWA and U.S. Environmental Protection Agency will submit a report on these issues to congress by July 1, 1993. Due to time constraints, however, this report will probably be limited to existing available information. Many provisions in Section 1038 of ISTEA are not entirely clear, and FHWA is in the process of seeking clarifications.

Meanwhile, many states are proceeding to construct CRA pavements this year and next year using different processes, such as the older wet process (also referred to as the McDonald or Arizona process), generic wet process (as used by Florida DOT), proprietary "Plus-Ride" dry process, and generic dry process.

(Source: Asphalt Technology News, Fall 1992.)

Selected References

The following can be obtained directly from the sources listed.

AASHTO Guidelines for Traffic Data Programs

This just released booklet by AASHTO is available for $17 per copy plus $3 for postage and handling of single copies. "The objective of the guidelines is to improve the quality of the traffic information that supports decisions at all levels of the transportation profession." The booklet, according to AASHTO, provides a reference for profession traffic monitoring and establishes a process for adoption of national traffic monitoring standards. Contact AASHTO at (202) 624-5800.

U.S. EPA's Help! EPA Resources for Small Governments

This guide lists financial, technical, and educational assistance available to small communities. The 98-page report is available for $3. To order, send payment to Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

Traffic Access and Impact Studies for Site Development

This report from ITE's Transportation Planners Council describes the key elements required for preparing and reviewing access and impact studies for new and expanding land developments. It is intended to provide guidance and encourage consistency in planning site access, on-site circulation and parking layouts, and off-site improvements. The report will prove useful to traffic/transportation engineers and planners, as well as public agency reviewers involved in the development approval process. An ITE Recommended Practice by Task Force on Traffic Access/ Impact Studies, chaired by Brian S. Bochner. ITE, 1991. 52 pages. Publishing number RP-020B; $40 ($25).

Transportation Planning Handbook

The Transportation Planning Handbook, a companion publication to ITE's Traffic Engineering Handbook, is a handy standalone reference for the transportation professional involved in the broader issues of traffic engineering and transportation planning. ITE, 1992. 525 pages, case bound. Publishing number TB-011; $70.

Free Publications

For Washington recipients only: Contact Donna Stallings at (206) 705-7372 or SCAN 705-7372 if you want publications.

FHWA-RT-88-039, Improving Operational Safety on Local Roads and Streets. U.S. Department of Transportation. This pamphlet is intended as a general guide to effective, low-cost methods of improving and enhancing operational highway safety. The guidelines and examples included are based on actual situations and observations made in series of nationwide reviews (25 copies available).

Improving Guardrail Installations on Local Roads and Streets. U.S. Department of Transportation. This pamphlet is intended as a general guide to effective, low-cost methods of enhancing highway safety with guardrails (15 copies available).

Roadside Improvements for Local Roads and Streets, FHWA. This is a brief 31-page guide for helping to improve safety on local roads and streets (10 copies available).

W-Beam Guardrail Repair and Maintenance, FHWA. This brief guide was prepared under the RTAP by the T^2 Center in Iowa. It is a very basic guide for recognizing extent of guardrail damage, the process for repairs, and consideration for safety (40 copies available).

FHWA-FL-90-006 Fish Passage Through Culverts. This booklet was prepared by the United States Department of Agriculture — Forest Service to provide a set of guidelines for the design and rehabilitation of culverts which allow fish passage. Working as a team, hydrologists, fish biologists, and civil engineers can design, construct, and maintain an acceptable structure with fish passage capabilities. The very vivid principles and criteria can be adapted to the design of any drainage structure. (T^2 Manager's comments) Frank E. Votapka, professional engineer, and Calvin O. Baker, fish biologist, with the USFS have put together a very thorough, precise, and useful guide that can be useful to any agency faced with correcting or improving water facilities in conjunction with environmental concerns — in this case, fish movements in a stream through road drainage structures. The 40-page text with some 20 pages of appendix materials can be a useful tool. Mr. Votapka has offered to reprint approximately 150 copies for our use. We expect to have these on hand by the time you read this.

FHWA-RT-90-003, Vegetation Control for Safety. This booklet is a general guide for street and highway maintenance personnel on vegetation control, line of sight clearance, and safety considerations (30 copies available).

FHWA-PD-92-028, Bicycle and Pedestrian Provisions Under the Intermodal Surface Transportation Efficiency Act (ISTEA). This pamphlet describes the opportunities that ISTEA offers to enhance state and local bicycle and pedestrian programs (30 copies available).

Educational Opportunities

The purpose of this column is to inform you of the numerous educational opportunities that exist for our Washington State and adjacent states' transportation people. We also place this information on our electronic bulletin board.
To obtain a brochure of details on the workshops listed, please contact the Northwest T² Center at (206) 753-0405.

Northwest Technology Transfer Center ------ (206) 753-0405

The T² Center offers or supports numerous workshops of interest to public works agencies in Washington. Announcements are advertised in the newsletter, the Bulletin, and flyers are sent out to public works agencies requesting their interest prior to the workshops.

- ❑ **Crumb Rubber Modifier Regional Workshop.** March 25-26, 1993. Red Lion Inn, Spokane. Contact Stephanie Tax at (206) 753-0405.

County Road Administration Board (CRAB)

If there is a special class you would like to see developed for counties, contact CRAB at (206) 753-5989.

Arasmith Consulting Resources (ACR) ------- (503) 928-5055

- ❑ **Cave-in Protection Competent Person Training.** January 7-8, 1993, Quality Inn — Westwater, Olympia; February 16-17, 1993, Quality Inn — Seattle North, Everett. Cost $270.

Washington State University ---------- (206) 840-4575

- ❑ **Project Management: Planning, Scheduling, and Control.** February 16-18, 1993, Red Lion Hotel, SeaTac. Cost $995.
- ❑ **How to Implement the Deming Approach for Quality Improvement in Services.** February 23-25, 1993, Red Lion Hotel — Columbia River, Portland, OR. Cost $945.
- ❑ **Improving Management Skills of the New or Prospective Manager.** February 25-26, 1993, Red Lion Hotel, SeaTac. Cost $695.
- ❑ **How to Apply Deming's Quality Improvement Principles to Public Sector Services and Administrative Operations.** March 1-2, 1993, Red Lion Hotel — Columbia River, Portland, OR. Cost $795.
- ❑ **Construction Cost Estimating and Bidding.** March 1-2, 1993, Red Lion Inn — Columbia River, Portland, OR. Cost $745.

ASCE ---------- 1-800-548-2723

- ❑ **How to Install Underground Utilities Using Trenchless Technology.** February 18-19, 1993, Seattle; February 22-23, 1993, Portland. Cost $645 for members, $745 for nonmembers.
- ❑ **Soil Liners and Covers for Landfills.** March 10-11, 1993, Radisson Hotel, Seattle Airport. Members $645, others $745.
- ❑ **Computer Aided Hydrology and Hydraulics.** March 11-12, 1993, Portland, OR. Cost $695 for members, $795 for nonmembers.

Professional Engineering Practice Liaison Program (PEPL), University of Washington, College of Engineering ---------- (206) 543-5539

(All classes are at the University of Washington unless otherwise noted.)

- ❑ **Managing People (Including Yourself) for Project Success.** Two Mondays per month; January 11 and 25, 1993; February 8 and 22, 1993. Cost $695.
- ❑ **Seismic Design of Structures II: Structural Design and Detailing Requirements.** January 19, 21, 26, and 28, 1993; February 2, 4, 9, 16, and 18, 1993. Cost $355.

UW — College of Engineering ---------- (206) 543-5539

- ❑ **Drilling and Blasting Techniques.** January 25-29, 1993, Monday through Friday, 8:00 a.m. to 5:00 p.m. Cost $825.

Asphalt Institute ---------- (206) 786-5119

- ❑ **New Asphalt Pavement Technology — The State of the Art.** March 11-12, 1993; Bellevue. Cost $300. Contact Ed Schlect.

National Businesswomen's Leadership Association ---------- 1-800-258-7246

- ❑ **Powerful Communication Skills for Women.** January 20, 1993, Spokane; January 21, 1993, Everett; January 22, 1993, Seattle; January 26, 1993, Pasco; January 27, 1993, Yakima; January 28, 1993, Tacoma; and January 29, 1993, Olympia. Cost $69.

Fred Pryor Seminars ---------- 1-800-255-6139

- ❑ **Business Writing for Results.** January 21, 1993, Portland, OR; January 22, 1993, Tacoma; January 25, 1993, Spokane; January 26, 1993, Everett; January 27, 1993, Olympia; and January 28, 1993, Seattle. Cost $99.
- ❑ **Evelyn Wood's Reading Dynamics for Business Professionals.** February 4, 1993, Portland, OR; February 5, 1993, Tacoma; February 15, 1993, Spokane; February 16, 1993, Everett; February 17, 1993, Olympia; and February 18, 1993, Seattle. Cost $195.

American Management Association --------- 1-800-255-4141

- ❑ **Basic Supervisor's Seminar.** March 2, 1993, Marriott Hotel, Portland, OR; March 3, 1993, Seattle Hilton; March 3, 1993, Cavanaughs River Inn, Spokane; and March 4, 1993, Shilo Inn, Richland. Cost $125.
- ❑ **PC Shortcuts That Will Help You Work Faster.** February 12, 1993, Holiday Inn West, Spokane; February 23, 1993, Red Lion Columbia River, Portland, OR; February 24, 1993, Red Lion Hotel, Pasco; and February 25, 1993, Red Lion Hotel, SeaTac.

Washington Society of Professional Engineers ----------(206) 885-2660

- ❑ **How to Recognize and Clean Up Contaminated Hazardous Waste Sites**, January 14, 1993, Seattle Airport Hilton. Cost $65 for WSPE members, $75 for nonmembers. This one-day workshop by WSPE is being conducted in cooperation with the Washington State Department of Ecology — Toxic Cleanup Program. Particular questions to be answered by the course include: (1) What is the regulatory framework related to the cleanup of a contaminated site, (2) How do I recognize a contaminated site, (3) What is required when underground storage tanks are involved, (4) What is required and how do I cleanup a contaminated site, (5) What safety procedures are needed, and (6) What technologies and methods are available to clean up a contaminated site. Not knowing the answers to these questions could be very expensive to you, your agency, your firm, or your client. Any questions on the course should be directed to John Tevis at (206) 753-7198.

Conferences and Meetings

- ❑ National Association of County Engineers Annual Meeting, January 31 through February 3, 1993, San Antonio Convention Center, Texas. Contact Woodson Martin (202) 393-5041.
- ❑ ASCE, Olympia/Tacoma Section Joint Meeting, St. Martin's College, February 12, 1993.
- ❑ 1993 National Conference for Rural IVHS, February 21-23, 1993, Keystone, Colorado. Sponsored by IVHS America, The Enterprise Group, FHWA, and Colorado DOT. Contact (303) 779-0015.
- ❑ 1993 Road Builder's Clinic, March 2-4, 1993, Coeur d'Alene, Idaho.
- ❑ ITE International Conference, March 14-17, 1993, Hyatt Orlando Hotel, Florida. Contact (202) 554-8050.
- ❑ 1993 American Road and Transportation Builders Association (ARTBA) Annual Convention, March 25-28, 1993, Hotel del Coronado, San Diego, California. Contact (202) 488-2722.
- ❑ National Conference on Aquifer and Wellhead Protection, March 28 through April 1, 1993, Coeur d'Alene Resort, Idaho. Contact (509) 456-3600 or (509) 456-6024.
- ❑ Geosynthetics Conference, March 30 through April 1, 1993, Vancouver, B.C. Contact (612) 222-2508 or 1-800-225-4324.
- ❑ Washington Association of County Road Supervisors, April 26-28, 1993, Westcoast Wenatchee Center. Contact Ed Rich, Douglas County.
- ❑ APWA, WA-OR Chapters Joint Spring Conference, May 5-7, 1993, Portland, Oregon.
- ❑ Pacific Rim Transtech Conference, July 25-28, 1993, Seattle, Washington. For more information, contact James R. Buss, WSDOT, (206) 705-7801.
- ❑ APWA 1993 International Public Works Congress and Exposition, September 18-23, 1993, Phoenix, Arizona.
- ❑ ISTEA Workshops for Rural and Small Urban Officials, March 8-9, 1993, Boise, Idaho. This is one of eight workshops throughout the nation being held by USDA Regional Rural Development Centers. Co-sponsors include NACE, NACO, USFS, FHWA, FTA, and USDA. Contact Western Rural Development Center, Oregon State University, Corvallis, OR 97331-3607 or phone (503) 737-3621.

The BULLETIN

Winter 1992/1993

The Technology Transfer (T^2) Program is a nationwide effort financed jointly by the Federal Highway Administration (FHWA) and individual state departments of transportation. Its purpose is to translate into understandable terms the latest state-of-the-art technologies in the areas of roads, bridges, and public transportation to local highway and transportation personnel.

Any opinions, findings, conclusions, or recommendations presented in this newsletter are those of the authors and do not necessarily reflect the views of WSDOT or FHWA. All references to proprietary items in this publication are not endorsements of any company or product.

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